What is claimed is:

1. A method for manufacturing thin-film electrochemical devices comprising the steps of

forming an anode layer;

applying an electrolyte layer to one face of said anode layer, and around said anode layer's edges;

applying a cathode layer to a portion of the exposed face of said electrolyte layer, leaving a gap extending from the edge of said face radially inward;

applying an interconnect layer to said anode layer, covering the entire exposed surface of said anode layer; and

applying an interconnect layer to said cathode layer, and to the remaining exposed electrolyte layer, covering the exposed surface of the electrolyte layer.

2. The method of claim 1 wherein said anode layer comprises a Ni/yttria stabilized zirconia cermet.

3. The method of claim 1 wherein said electrolyte layer comprises a material selected from a group comprising: yttria stabilized zirconia, a mixed ion and electron conductor, and a composite of a metal and an ion conductor.

4. The method of claim 1 wherein said cathode layer comprises a composite of strontium-doped lanthanum manganite.

5. The method of claim 1 wherein said cathode layer comprises yttria stabilized zirconia.

6. The method of claim 1 wherein said interconnect layer comprises a material selected from a group comprising: metal, alloy, and ceramic.

7. The method of claim 1 wherein said forming an anode layer comprises tape casting.

8. The method of claim 1 wherein said applying an electrolyte layer comprises a thin-film deposition technique.

9. The method of claim 8 wherein said thin-film deposition technique comprises a technique selected from a group comprising: aqueous spray deposition, tape casting, co-casting onto said anode layer, thermal spray, plasma spray, and directed vapor deposition.

10. The method of claim 1 wherein said applying a cathode layer comprises a thin-film deposition technique.

11. The method of claim 10 wherein said thin-film deposition technique comprises screen printing.

12. The method of claim 1 wherein said applying an interconnect layer comprises a thin-film deposition technique.

13. The method of claim 12 wherein said thin-film deposition technique comprises a technique selected from a group comprising: thermal spray, directed vapor deposition, plasma spray, tape-casting, and co-casting onto a porous catalyst layer.

14. The method of claim 1 wherein said applying an interconnect layer comprises applying over a removable core.

15. The method of claim 1 wherein said applying an interconnect layer comprises applying over a shaped form.

16. The method of claim 1 wherein said applying an interconnect layer comprises a ceramic-to-metal joining technique.

17. The method of claim 16 wherein said ceramic-to-metal joining technique comprises a technique selected from a group comprising: transient liquid phase bonding and brazing.

18. The method of claim 1 further comprising applying a buffer layer between a pair of layers.

19. The method of claim 18 wherein said buffer layer is applied between an interconnect layer and another layer.

20. The method of claim 1 wherein said anode and said cathode layer comprise porous catalyst layers.

21. The method of claim 21 wherein said porous catalyst layers comprise a material selected from a group comprising: a mixed ion and electron conducting ceramic and a composite of metal and an ion conducting ceramic.

22. The method of claim 20 wherein said porous catalyst layers are formed by a thin-film deposition technique.

23. The method of claim 22 wherein said thin-film deposition technique comprises a technique selected from a group comprising: tape-casting, screen printing, thermal spray, and plasma spray.

24. An apparatus for use as a thin-film electrochemical device comprising

an anode layer;

an electrolyte layer on said anode layer;

a cathode layer on said electrolyte layer;

a first interconnect layer on said anode layer; and

a second interconnect layer on said cathode layer.

25. The apparatus of claim 24 wherein said anode layer comprises a Ni/yttria stabilized zirconia cermet.

26. The apparatus of claim 24 wherein said electrolyte layer comprises yttria stabilized zirconia.

27. The apparatus of claim 24 wherein said cathode layer comprises a composite of strontium-doped lanthanum manganite and yttria stabilized zirconia.

28. The apparatus of claim 24 wherein an interconnect layer is metallic.

29. The apparatus of claim 24 further comprising a buffer layer between a pair of said layers.

30. An apparatus comprising a plurality of thin-film electrochemical devices of the apparatus of claim 24 bonded together.

31. The apparatus of claim 30 wherein said bonding comprises transient liquid phase bonding.

32. The apparatus of claim 30 wherein said bonding comprises brazing.

33. The apparatus of claim 24 wherein said anode and said cathode layers comprise porous catalyst layers.

34. The apparatus of claim 33 wherein said porous catalyst layers comprise a mixed ion and electron conducting ceramic.

35. The apparatus of claim 33 wherein said porous catalyst layers comprise a composite of a metal and an ion conducting ceramic.

36. The apparatus of claim 24 wherein said electrolyte layer comprises a mixed ion and electron conductor.

37. The apparatus of claim 24 wherein said electrolyte layer comprises a composite of a metal and an ion conductor.

38. The apparatus of claim 24 wherein said interconnect layers comprise ceramic.

39. The apparatus of claim 30 wherein said plurality of thin-film electrochemical devices are bonded together by a technique comprising ceramic-ceramic bonding.

40. A method of manufacturing stacks of thin-film electrochemical devices comprising the step of connecting a plurality of apparatus of claim 24.

41. The method of claim 40 wherein said connecting comprises a technique selected from a group comprising: ceramic-ceramic bonding, transient liquid phase bonding, and brazing.